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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ALUNKAL, THOMAS D	
ART UNIT	PAPER NUMBER
2627	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/526,646	NAKATA ET AL.	
	Examiner	Art Unit	
	Thomas D. Alunkal	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *18-24* is/are allowed.

6)☒ Claim(s) *1-11,13-17 and 25-29* is/are rejected.

7)☒ Claim(s) *12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Amendment –After Non-Final Rejection, filed 12/22/06, with respect to the rejection(s) of claim(s) 1-29 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made. See below.

Claim Objections

Claim 14 is objected to because of the following informalities: Currently presented, claim 14, line 1, states "..wherein the ***radical*** position...". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites the limitation "the light beam separator " in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7,9,15-17, and 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katayama (US 6,804,180).

Regarding claim 1, Katayama discloses an optical head (see Title) comprising: a semiconductor laser (Figure 12, Element 57), and objective lens for focusing a light beam from the semiconductor laser onto an information recording medium (Figure 12, Element 5), a light beam separator that is located between the semiconductor laser and the objective lens (Figure 12, Element 59), includes interference regions (Figure 2) for light that is reflected from the information recording medium, and diffracts light beams in regions of the interference regions, where an amount of light is changed by a change in a relative angle between the information recording medium and the objective lens and by a shift of the objective lens in a radial directions the information recording medium (Column 3, lines 22-64), a light-receiving element that receives the light beam that is reflected by the information recording medium and separated by the light beam separator, and converts the light beam to an electrical signal (Figure 12, Element 58), and an arithmetic circuit that corrects a value of the electrical signal detected by the light receiving element in accordance with a radial position signal corresponding to an

amount of shift of the objective lens in the radial direction of the information recording medium, and detects the relative angle between the information recording medium and the objective lens or an amount of tilt of the information recording medium with respect to a predetermined reference plane (Figure 12, Element 42B and Column 9, lines 29-67). Katayama does not explicitly disclose that the light beam separator receives +/- first order diffracted light produced by the recording medium. However, Figure 17 discloses that it is conventional to use a diffraction grating (Element 107) acting upon light emitted from the semiconductor laser which produces +/- first order diffracted light.

There, it would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the collimator lens of the prior art to the optical head of Katayama, motivation being to properly diffract light which is incident upon the interference regions of holographic optical element (Figure 2), which results in the high accuracy of tilt detection.

Regarding claim 2, Katayama discloses wherein the light beam separator diffracts part of each of the light beams in the interference regions (Figure 2 and Column 7, lines 17-61).

Regarding claim 3, Katayama discloses wherein the plural light beams are present in four regions of the light beam separator, the four regions are separated from each other by an axis in the radial direction and an axis in a tangential direction, and the two axes pass through a substantial center of the light that is reflected from the information recording medium and travels in a straight path (Figure 2).

Regarding claim 4, Katayama discloses an objective lens drive for driving the objective lens in the radial direction and a focusing direction (Figure 12, Element 43), wherein the radial position signal is calculated by using an applied current to drive the objective lens in the radial direction (Column 13, line 65 – Column 14, line 8).

Regarding claim 5, Katayama discloses wherein the radial position signal is produced by calculating amounts of light in at least two regions of the light beam separator, and the at least two regions are outside the interference regions and are separated from each other by an axis in a tangential direction passing through a substantial center of the light that is reflected from the information recording medium and travels in a straight path (Figures 2 and 3).

Regarding claim 6, Katayama discloses the claimed invention (the light beam separator is a hologram (Figure 12, Element 59) except for the hologram is made of resin or glass.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to manufacture the hologram out of the desired material since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 7, Katayama discloses wherein the light beam separator comprises a quarter wave plate (Figure 12, Element 4) and a polarizing hologram that has a diffraction effect only for a light beam of a predetermined polarization component (Figure 9, Element 59), and the light-receiving element receives the light beam

diffracted by the polarizing hologram. Katayama does not disclose the arrangement or parts as disclosed by the claim.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to interchange the positions of the light beam separator and the quarter wave plate, since it has been held that a mere reversal of the essential working parts of a device involves only routine skill in the art. *In re Einstein,* 8 USPQ 167.

Regarding claim 9, Katayama discloses a collimator lens between the objective lens and the semiconductor laser (Figure 12, Element 2). Katayama does not discloses wherein the collimator lens is integrated with the light beam separator.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to integrally combine the light beam separator and the collimator lens, since it has been held that forming in one piece an article, which has formerly been formed in two pieces and put together, involves only routine skill in the art. Howard v. Detroit Stove Works, 150 U.S. 164 (1893). The term "integral" is sufficiently broad to embrace constructions united by such means as fastening and welding. *In re Hotte*, 177 USPQ 326, 328 (CCPA 1973).

Regarding claim 15, Katayama discloses an optical head (see Title) comprising a semiconductor laser (Figure 17, Element 105), an objective lens for focusing a light beam from the semiconductor laser onto an information recording medium (Figure 17, Element 109), a light beam separator that is located between the semiconductor laser and the objective lens and forms a plurality of spots on the information recording

medium (Figure 17, Element 107), a light-receiving element that receives a light beam of each of the light sports reflected by the information recording medium, and converts received light to an electrical signal (Figure 17, Element 113), and an arithmetic unit that calculates the electrical signal converted by he light-receiving element, and detects the relative angle between the information recording medium and the objective lens (Column 2, lines 36-59).

Regarding claim 16, Katayama discloses an objective lens drive for driving the objective lens in the radial direction and the focusing direction (Figure 12, Element 43), wherein rotational adjustment of the light beam separator with respect to the information recording medium is performed by rotating the objective lens drive around a central axis of the objective lens and an arrangement of the light spots on the information recording medium is adjusted by the rotational adjustment (Column 13, line 65-Column 14, line19).

Regarding claim 17, Katayama discloses wherein the light beam separator is a hologram or a diffraction grating (Figure 12, Element 59)

Regarding claim 25, Katayama discloses an optical head (see Title) comprising a semiconductor laser (Figure 17, Element 105), an objective lens for focusing a light beam from the semiconductor laser onto an information recording medium (Figure 17, Element 109) an objective lens drive for driving the objective lens (Figure 12, Element 43), a voltage controller for applying a voltage to the objective lens drive so that the objective lens is driven in a focusing direction (Column 9, lines 29-40), a light-receiving element that receives a light beam reflected from the information recording medium and

produces a focusing error signal (Figure 12, Element 58), an arithmetic unit that detects a relative position of the information recording medium with respective to a predetermined reference position in the focusing direction, and calculates at least one selected from the relative angle between the information recording medium and the objective lens, the amount of tilt, the amount of warping, and the cross-sectional shape of the information recording medium by using a driving signal applied to the objective lens drive by the voltage controller and a focusing error signal producing by the light-receiving element (Figure 12, Element 42B and Column 9, lines 29-67).

Regarding claim 26, Katayama discloses wherein the reference position is any one selected from a turntable for holding the information recording medium, part of the optical head, and a guide shaft of the optical head.

Regarding claim 27, Katayama discloses wherein the driving signal from the voltage controller is one selected from a triangular wave, a sine wave and a trapezoidal wave (Figure 12, Elements 42 and 43. Specifically, the processing unit can send the any of these wave types).

Regarding claim 28, Katayama discloses wherein the arithmetic unit detects relative positions of the information recording medium with respect to the reference position in the focusing direction in at least two different portions of the information recording medium in the radial directions, and calculates at least one selected from the amount of tilt of the information recording medium, and relative angle between the information recording medium and the objective lens, the amount of warping and the

cross-sectional shape of the information recording medium by using the relative position (Figure 12, Element 42B and Column 9, lines 29-67).

Regarding claim 29, Katayama discloses wherein at least one selected from the amount of tilt corresponding to the calculated radial position of the information recording medium, the relative angle between the information recording medium and the objective lens, the amount of warping and the cross-sectional shape of the information recording medium is stored in a memory, and a tilt correction signal is generated to change the relative angle between the objection lens and the information recording medium in accordance with radial position by using information of the memory (Figure 12, Element 42B and Column 9, lines 29-67. In addition, it is an inherent property of the tilt control to measure the tilt in reference to a predetermined value (i.e. reference angle information)).

Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Katayama as applied to claims 1-7,9,15-17, and 25-29 above, and further in view of Komma et al (hereafter Komma)(US 5,737,296).

Regarding claim 8, Katayama does not discloses wherein the light beam separator is integrated with the objective lens and moved together with the objective lens in a focusing direction and the radial direction. In the same field of endeavor, Komma discloses including a holographic light beam separator within an objective lens holder.

It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to provide the multiple part inclusive lens holder of Komma to the optical head of Katayama, motivation being to reduce the overall size of the optical head.

Claims 10-11 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katayama (US 6,804,180) and in view of Matsui et al (hereafter Matsui)(US 5,231,621).

Regarding claim 10, Katayama discloses an optical head (see Title) comprising a semiconductor laser (Figure 17, Element 105), an objective lens for focusing a light beam from the semiconductor laser onto an information recording medium (Figure 17, Element 109), a light-receiving element that includes a light-receiving region for receiving the reflected light beam (Figure 12, Element 58), and an arithmetic circuit that detects the amount of tilt of the objective lens with respect to a predetermined reference plane by using an electrical signal detected by the light-receiving element and a radial position signal corresponding to the amount of shift of the objective lens in the radial direction (Figure 12, Element 42B and Column 9, lines 29-67). Katayama does not disclose a light beam reflection portion that reflects the light beam from the semiconductor laser and moves together with the objective lens. In the same field of endeavor (i.e. using reflected light to determine focus error), Matsui discloses the use of a reflective element (Figure 2, Element 8) used to determine the focus error.

It would have been obvious to one or ordinary skill in the art at the time of the applicant's invention to provide the reflective element of Matsui to the optical head of Katayama, motivation being to alternatively allow for the tilt detection of the objective lens without the requirement of inserting an optical medium, therefore, simplifying the optical head.

Regarding claim 11, neither Katayama nor Matsui disclose wherein the light beam reflection portion is formed in an objective lens holder for holding the objective lens. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to position the light beam reflection portion into the objective lens holder, since it has been held that forming in one piece an article, which has formerly been formed in two pieces and put together, involves only routine skill in the art. Howard v. Detroit Stove Works, 150 U.S. 164 (1893). The term "integral" is sufficiently broad to embrace constructions united by such means as fastening and welding. *In re Hotte*, 177 USPQ 326, 328 (CCPA 1973).

Regarding claim 13, Katayama discloses an objective lens drive for driving the objective lens in the radial direction and the focusing direction (Figure 12, Element 43), wherein the radial position signal is calculated by using an applied current to drive the objective lens in the radial direction (Column 13, line 65-Column 14, line 8).

Regarding claim 14, Katayama discloses wherein the radial position signal is produced by calculating the amounts of light in at least two regions of the light beam separator, and the at least two regions are outside the interference regions for light that is reflected from the information recording medium and travels in a straight path and +/-

first-order diffracted light produced by information tracks of the information recording medium and are separated from each other by an axis in the tangential direction passing though a substantial center of the light that is reflected from the information recording medium and travels in a straight path (Column 3, lines 22-64 and Figures 2 and 3).

Allowable Subject Matter

Conclusion

Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art (see cited references) taken either singularly or in combination fails to anticipate or fairly suggest the optical head according to claim 10, further comprising an objective lens drive for adjusting the inclination angle of the objective lens ***and a second light-receiving element for receiving a light beam reflected by the information recording medium, wherein the relative angle between the information recording medium and the objective lens is detected by using an electrical signal detected by the second light-receiving element and the electrical signal of the light-receiving element while adjusting the inclination angle of the objective lens by the objective lens drive.***

Claims 18-24 allowed.

The following is an examiner's statement of reasons for allowance: The prior art (see cited references) taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the independent claims 18 and 22 in such a manner that a rejection under 35. U.S.C 102 or 103 would be proper.

Regarding claim 18, the prior art taken either singularly or in combination fails to anticipate or fairly suggest an optical head comprising: a semiconductor laser for emitting divergent light: an objective lens for focusing the divergent light from the semiconductor laser onto an information recording medium; ***a light beam reflection portion that reflects a portion of a light beam traveling substantially outside an effective light beam diameter of the objective lens onto the information recording medium***; a light-receiving element including at least two light-receiving portions, each of which receives the light beam that is reflected by the light beam reflection portion and then is reflected by the information recording medium; and an arithmetic unit that calculates the amount of light entering the light-receiving element, and detects the amount of tilt of the information recording medium with respect to a predetermined reference plane.

Regarding claim 22, the prior art taken either singularly or in combination fails to anticipate or fairly suggest An optical head comprising: a semiconductor laser for emitting divergent light; an objective lens for focusing the divergent light from the semiconductor laser onto an information recording medium; a collimator lens located between the semiconductor laser and the objective lens; ***a light beam reflection***

portion that reflects part of a light beam traveling substantially outside an effective light beam diameter of the objective lens or the collimator lens onto the information recording medium; a light-receiving element including at least two light-receiving portions, each of which receives the light beam that is reflected by the light beam reflection portion and then is reflected by the information recording medium; and an arithmetic unit that calculates the amount of light entering the light-receiving element, and detects the amount of tilt of the information recording medium with respect to a predetermined reference plane.

Claims 19-21 and 23-24 are allowed with their respective base claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Matsubara et al (5,430,699) disclose an optical reading and writing device. Itakura et al (US 5,978,332) disclose a tilt detector and tilt correcting method. Chang et al (US 6,525,332) disclose a method for detecting and compensating disk tilt and apparatus. Ishibashi (US 5,523,989) disclose an optical disk drive having functions of detecting disk tilt from a diffraction pattern of track and compensating disk tilt with use of comatic lenses. Ishibashi et al (US 5,751,680) disclose an optical disk drive. Koike et al (US 5,216,649) disclose an optical head with a tilt correction servo mechanism.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Alunkal whose telephone number is (571)270-1127. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571)272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas Alunkal

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER